Umbrella
Supplement 0.4

The Chihuahuan Desert Lab: An Overview

The Chihuahuan Desert Lab provides students with the opportunity to do real scientific research on national parklands using sophisticated technologies. Students collect inventory data, monitor human-caused impacts on the environment, restore disturbed desert grasslands, monitor the reintroduction of prairie dogs and analyze data using the Geographical Information System. The four science projects are summarized below.

Revegetation of the Chihuahuan Grassland Ecosystem

Because native plants are difficult to establish from seed, land managers in the past used introduced (non-native) plants. This trend began to change in the 1970s, when it was recognized that introduced plants often replaced native plant populations, destroying the naturally functioning ecosystems that the national parks are created to preserve. Modern-day activities, such as construction and other park activities, create disturbed sites within the park.

The purpose of this project is to develop an understanding of revegetation of disturbed areas using native plants and native plant propagules, and to develop opportunities to assist Carlsbad Caverns National Park in revegetating some disturbed areas. Students study the desert communities within the park with an emphasis on reviewing the individual characteristics of native plants species that make them good candidates for replanting on disturbed sites. Plant communities adjacent to the disturbed sites are surveyed to determine appropriate species for planting those sites. the students assist in the revegetation of a disturbed sited by a combination of possible methods: planting locally collected native seeds, replanting salvaged native plants that were uprooted by construction, and germinating and growing selected native plants to produce transplants. Student teams return to the sites six times during the first year to water and plant starts and to measure the survival rate for the selected native species. The natural recruitment of native plants and the invasion of exotic species on the disturbed site will be monitored. The exotic species are removed. The monitoring data collected will help evaluate revegetation procedures for the northern Chihuahuan Desert area.

Reintroduction and Monitoring of Prairie Dog Populations

The black-tailed prairie dog was once common in the Guadalupe Mountains National Park. For almost a century, the black-tailed prairie dog was considered a pest, and populations in the Chihuahuan Desert were almost eliminated; they now occupy only two percent of their former geographic extent.

In pristine Chihuahuan Desert grasslands, black-tailed prairie dogs provided channels that move surface water flows quickly to ground water storage sites. Springs were abundant in the area. Animal diversity was great because many reptiles, birds and mammals lived in prairie dog towns. Plant diversity was increased because black-tailed

prairie dogs heavily grazed surrounding grasslands and provided disturbed sites that aided in the establishment of annual forbs and grasses.

Students participating in this project, live-trap black-tailed prairie dogs; determine and prepare a suitable diet for captive animals; monitor animal movement and enter data into the Geographic Information System; and establish and collect transect data to determine changes in reptile, rodent, avian, mammals and vegetation populations.

Water Quality Monitoring of Human Impact

The cave pools in Carlsbad Cavern receive heavy visitor use on adjacent trails. This project is the first attempt to systematically monitor water quality in Carlsbad Cavern.

Students determine the impact from visitors and staff on water quality in cave pools by using a systematic sampling system. They measure dissolved oxygen, nitrates conductivity and temperature on site. Students analyze water samples back in the classroom for key water quality indicators. Random samples are tested for heavy metal through Carlsbad Environmental Monitoring and Research Center.

Inventorying, Banding and Monitoring of Cave Swallows

One of the most significant bird species in North America uses Carlsbad Cavern as a summer nesting home. In 1966, two nesting pairs of cave swallows arrived at Carlsbad Cavern and made their nests just inside the entrance. Since then, the population has gradually increased to more than 4,000 birds. Although the colony varies in size from year to year, it is the northern-most and largest known colony of this species in the United States. A migratory species, the cave swallows usually arrive at Carlsbad Cavern in the early spring and depart for unknown wintering grounds by late fall. While at least one banded cave swallow has been identified during the winter in South America, the specific wintering location remains a mystery. Soon after the cave swallows began nesting inside Carlsbad Cavern, an extensive banding project was initiated.

The primary purpose of this project is to learn more about the birds and ultimately to discover their winter range. Students continue the two-decades-old cave swallow project by netting and assisting in the banding process of the birds. They enhance the project by using sound recordings at the entrance of Carlsbad Cavern and other sites.